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ABSTRACT

Arguing that the arts can contribute to the understanding of relationships basic to reading comprehension by providing opportunities for students to deal with abstractions and to form perceptual images related to those abstractions, this paper also contends that the arts can provide a means for transfer of basic concepts by taking seemingly unrelated forms and providing occasions for discovering relationships. Sections of the paper contain the following: (1) a discussion of the relationships that are important for reading comprehension and how the arts can contribute to understanding them, (2) a review of the research into the relationship between the arts and the cognitive processes, and (3) a description of an activity for helping students understand the relationships of similarities and differences, superordinate and subordinate, space and direction, categorizing versus describing, intersections, and values that shift according to context. (FL)

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Improving Reading Comprehension:

Teaching Relationships

Through the Arts

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Christian Gerhard
Paper to be presented at the UKRA Annual Conference
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INTRODUCTION

I would not urge arts education because it contributes to mastery of the mechanics of reading, writing, or computation, but rather because it enriches the store of images that make comprehension of concepts possible and comprehensive.

This is a statement by Harry Broudy (1979) from which we can make two important inferences for reading. The first is that reading, while it may include special skills, shares a background of mental action with other activities. The second is that it is what the reader brings to the page which influences comprehension.

The role of prior knowledge, emphasized at the 1980 UKRA Conference, is not yet fully understood, and may never be. However, we do know that for the reader it is shared knowledge expressed in the commonly accepted language of text, including cues to particular thought processes, which is essential. These cues may be as simple as the word and indicating the addition of a member to an already introduced category. Another example is or, indicating a choice between two members of a category or between two attributes or criteria.

Each person has to go through the process of experiencing events of particular kinds before the conventions of language can become meaningful (Lenneberg, 1967, Nelson, 1973). Some of these experiences must include opportunities to understand relationships between objects, people, or events, not just commonalities among these. It will be the object of this paper to suggest the special advantages of the arts in demonstrating the universality of important relationships and in offering the variety

of instances necessary for concept attainment over and above concept formation (Bruner et al., 1956).

As Howard Gardner wrote in his book, The Arts and Human Development (1973):

The arts have their evolutionary origins in the first generalized categories, which the primitive man extracts, or better, constructs from his experience and makes the foundation for his language, myths, and rituals.

To this we can add Elliot Eisner's statement (1980):

In all cultures, the range and variety of forms in which human thought finds expression are far wider than those salient in school programs. We can regard those forms, those carriers of memory, as "symbol systems" - the means through which personal images are transformed into public forms than can be shared with others.

Eisner sees education as cultivating literacy in the symbol systems, or languages, of the arts. In this pursuit a person learns "to use a variety of modes of thought - visual, auditory, kinesthetic...".

A language construction which might be made by the primitive man referred to by Gardner is, "We are stricken by a drought because the Gods are angry." A young child learning to read will not be burdened with this construction. The text is more likely to be "The cat sat on the mat." Even here it is not enough for the child to have images of both the cat and the mat. For true comprehension their relationship must be seen: the cat must be on the mat. This relationship is signaled by the word on which implies at least two items, one on the other, but otherwise has no meaning. For comprehension it is the image, not the definition, prepositional phrase, that counts. Lack of understanding of such relational words in the early stages of reading leads to very serious problems later.

It has never been suggested that images are not important in early stages of development, whatever some scholars say about them at later stages. Mental representations are the necessary, if not sufficient, basis for early comprehension without which more abstract thinking can never be attained. There has been increasing evidence from neuropsychological research (e.g., Luria, 1973) that this is so.

Images can be of various kinds, and different modes of perception interact (Walk, 1978). When reading the word parade, for example, even for an adult the images triggered may include colours, sharp beams of reflected light from brass instruments, movements of marching people or prancing horses, sensations from the beating of drums, agitating sounds from the other instruments, and feelings of excitement, anticipation, or perhaps physical discomfort. The author using the word parade counts on at least some of this reaction. A word like poem may bring on different reactions: of acute boredom or uneasiness, a sense of rhythm - te-tum-te-tum-te-tum-te-tum - or the sounds of rhyming combinations such as sigh and die, or maybe and baby. We may feel itchy or softly wrapped when we read wool or velvet. A wood fire or stew simmering on the stove in a story may smell delicious or bring on pangs of hunger.

The picture provided by the text, as Halliday and Hasan say (1976), is "not a photographic likeness but a symbolic representation." The picture is complete but out of focus because the reader has to provide "all the components of the picture which are not present in the text but are necessary to its interpretation" (p.299-300). Among these components are both sensory images and inferred relationships.

Rudolf Arnheim has done as much as anyone to make people aware that bringing a picture into focus depends on what they think. He deplores the lack of attention to the arts (1974, p.3).

The arts are neglected because they are based on perception, and perception is disdained because it is not assumed to involve thought... The neglect of the arts is only the most tangible symptom of the widespread unemployment of the senses in every field of academic study.

This "unemployment of the senses" in many schools includes lack of assistance in building mental images as called for by particular relational text cues.

There are studies which indicate the likelihood that images can slow down the reading of abstract material (e.g., Singer, 1980), and we are often reminded that perception becomes less important as we grow older. However, if we stop to think as adults how we go about learning in very new areas, do we not need concrete examples, analogies, even graphs and models, and are these not representations that have some of the qualities of images? If what has been strongly hinted is true, that not all of us attain Piaget's level of formal operations, or that we attain it only in certain areas, such as math and science, then many of us are still dependent on concrete connections and on images (Kuhn et al., 1977). This has implications for the teaching of relational concepts to older students. Do they really understand the function of words like which, not only, but, degree of, and even? If not, other reading skills will not help them much in a poorly written passage like the following from a ninth year textbook. (The subject is whales.)

A mammal from a hardly explored medium, which places great difficulties in the path of a psychologist, has been found not only to have strong social orientation, but to show a degree of initiative in experimenting with communication unmatched even by man's closest relative, the great ape.

Let us return briefly to "The cat sat on the mat" and the "little words" and and or. What happens to the meaning of the cat and mat if they are combined with these rather than on? Does their relationship change? If we use and, we place an inanimate with an animate object in the same category (Halliday and Hasan, 1976, p.274). It can be done as in, "Both the cat and the mat had seen better days." The word both provides the necessary redundancy in this forced situation. With the word or we face a choice between unequals. Again, a sentence such as "You may have either the cat or the mat" is conceivable but unlikely. It is, then, not only a matter of these words signalling a type of relationship, but also a matter of taking into account the probabilities and possibilities of the relationships between any two items (Whorf's cryptograms, Carroll (Ed), 1956).

WHAT ARE SOME OF THE RELATIONSHIPS WE NEED TO UNDERSTAND? HOW CAN THE ARTS CONTRIBUTE TO THIS UNDERSTANDING?

It is only possible to mention a few of the relationships which are important for reading comprehension and which can be taught through the arts. They belong to the "substrata of information" (Bransford and Johnson, 1973), the unspoken components of the text (Halliday and Hasan, 1976), or perhaps to "transitive inference" (Trabasso, 1975).

If a reader does not have these relational schemata, the guides to finding regularities, how can he or she acquire them, or become aware of them so that they can be useful tools? Bruner and his colleagues (1956, 1963) among others have helped us to understand that for concept formation we need a set of clear, positive instances. For concept attainment the criteria of the concept (e.g., and can only connect members of the same category) must be so well grasped that instances can be discriminated from non-instances in many different situations. What better means of presenting these instances can be found than the arts which provide us with different perspectives from which to perceive commonalities or parallels among perceptually very different materials? In addition, a visual, auditory, or kinesthetic image holds within it a complex relationship in an efficient format which can be conveniently filed in memory and evoked by even a small portion of a stimulus - a few notes of music or words of a poem.

A look at the list of relationships provided on page 7 will show that it is divided into two parts. The first set comprises concepts which are basic even to those who do not possess a written language.

Some Relationships Basic to Perception and Reading

Which can be Taught Through the Arts

I. Relational concepts which can exist in nature

Similarities and differences
Basic units or concepts and their transformations
Form and function
Symmetry or asymmetry
Repetition
Time and space
Cause and effect
"Natural categories"

II. Man's explanations of events

Similarities and differences
Content and process
Reversibility and irreversibility
Superordinates and their subordinates
Category to categories (hierarchies)
Categorizing and describing
Intersections
Part to whole
Shifting values among items or categories
Symbolism
Symbols and codes or rules

The second set is on a higher level of abstraction. Similarities and differences appear in both parts: in the first as the way in which we perceive reality and place stimuli in categories, and in the second for the perception of symbolic stimuli. "Natural categories" has been added to the original first section in deference to those scholars striving to understand "fuzzy sets" (Wang and Chang, 1980) and how people's minds work in daily life rather than in a Piagetian world (Rosch, 1966, 1977).

It will be noted that the relationships most closely connected to reading belong in the second set. We cannot decode without noting similarities and differences of letter shapes. The function of headings and topic sentences is not understood unless the superordinate/subordinate relationship is grasped. A table of contents is not a useful tool without a concept of hierarchies. The instability and flexibility of items grouped together for a particular purpose cannot be appreciated unless it is understood that the label for the group describes the relationship among the items, not the items themselves. The word symbols does not specify material, color, texture, or shape but it describes how a flag, a road number sign, a team mascot, and a trademark are related. The flexibility of inclusion in a group can be seen in a story where people have the confusing habit of growing up, moving to different places, becoming rich or poor, even dying! In biographies the subject is connected to many different groups in his or her lifetime. One has only to think of Albert Schweitzer.

Even this race through part of the list of relationships indicates that we are dealing with a highly complex situation. Adding the language

cues which are supposed to trigger awareness of a particular relationship compounds the problem.

A BRIEF LOOK AT RESEARCH IN THE RELATIONSHIP BETWEEN THE ARTS AND THE COGNITIVE PROCESSES AS BACKGROUND TO TEACHING RELATIONSHIPS THROUGH THE ARTS.

Research which is relevant to the relationship between the arts and the thinking processes has necessarily been fragmented. This is because this relationship reaches into the heart of a number of fields such as human development, perception (including pattern recognition), symbolic representation, imagery, language, information processing in its broadest sense, motivation, and learning (especially transfer). There is only space here to mention a fraction of the relevant research and then only in order to bolster the rather meager pickings in teaching applications. Much remains to be done if we are to continue the attempt to provide aids to reading comprehension for otherwise normal people who are not learning by established methods.

In a recent article Bruner and Olson (1978) refer to the arts as "the boldest attempt to test the combinatorial limits of a symbol system." This area of symbol systems has been studied for some time in Project Zero at Harvard. Among the scholars working there have been Nelson Goodman, Eisner, Gardner, Perkins, and Ives. Perhaps their best known work is on metaphor.

In Bulgaria progress of an entire curriculum based on Lozanov's theory of teaching with the arts is being carefully watched. At least one state school uses the curriculum (Pollack, 1976).

The fields of art and music therapy have provided pioneers in studies involving cognitive as well as emotional intervention through the arts. Numbers of subjects are limited and samples restricted, but interesting

beginnings have been made (e.g., Silver, 1976, 1977, 1978). Dwyer (1978) has conducted numerous studies with different populations on improving visual learning.

The investigation of verbal and/or nonverbal processing is being carried on by a wide variety of scholars. A central issue is the correlation between the two. The Raven Progressive Matrices have played an important part in the investigations (e.g., Keating and Bobbitt, 1978).

Developmental aspects of internal representation are discussed in Bruner et al. (1966), Arnheim (1969, see p.274), Gardner (1973, 1979), and many others. A musical therapist (Rider, 1978) has been working on a cognitive assessment tool and believes from his findings that tests of conservation of rhythm and tempo could be substituted for Piagetian tasks of mass and volume conservation.

Imagery research continues unabated. Paivio (1971) immediately comes to mind. Kolers and Smythe (1979) review different approaches to imagery and verbal processing. Of interest is the work of Rohwer (1970). Recently Richardson (1977) did some studies trying to isolate tests which might measure vividness and control of imagery. Memory and imagery are discussed by Anderson and Bower (1980).

Research in reader interpretation of relational adjectives and adverbs indicate that meaning is very much tied to real-world visual experience and consequently to cognitive development. Herbert Clark, Huttenlocher, and Donaldson have been active in this area. Wason and Johnson-Laird (1972) in investigating if statements found that the content of the material assumed enormous importance in comprehension.

There are bound to be many problems with research in internalizing complex relational concepts. Because many different experiences are necessary, true attainment of these concepts can only take place over the long term. The real consequences of acquiring a better "substrata of information" will not show up on demand, nor will we find it easy to isolate the results of independent variables. If we can isolate them, we may not have been successful, for the aim is for concepts to be filtered through experience until they become part of a vast network and intuitively perceived. As Fischbein (1975, p.20) says, intuition derives from action, "it summarises, concentrates, and determines the anticipatory cognitive qualities of adaptive action."

It would seem, then, that research in the effect of incorporating the arts into instruction as a means of providing the necessary "substrata of information" for reading will mean intervention in the form of teaching awareness of some of the basic relationships previously listed. The natural visual skills of students can provide one means (Kolars, 1977, Kolars and Smythe, 1979, Gerhard, 1980).

There is space in this paper only for describing one example of a possible intervention, but it is obvious that a relationship such as "basic concepts and their transformations" is also particularly approachable through all of the arts if it is translated into "theme and variations." Attainment of this concept is surely an advanced developmental equivalent of object permanency ("a door is a door even when it is ajar").

Research in this area will also mean helping teachers to do task analysis. "What are the images and relational structures needed to understand this passage?" must become as much a part of instruction as present

directed reading activities. Where there are gaps in prior knowledge they will have to be filled in. This will also require continuation of research in Piagetian-style activities to discover these gaps (e.g., Silver and Lavin, 1977, Levin et al., 1974). It may be found that students already function well in everyday life and only need bridges from that to school tasks, or awareness of the nature of the tasks (Laudoucer et al., 1979).

What follows is an example of what is meant by teaching relationships through the arts. It comes from the author's experience and is briefly described, along with similar activities, in the book Making Sense (1975). The original inspiration was the consensus among Vygotsky, Piaget, and Bruner that students must be given opportunities to act upon materials, make their own decisions, and carry on dialogue about them.

DESCRIPTION OF AN ACTIVITY FOR HELPING STUDENTS UNDERSTAND THE RELATIONSHIPS OF SIMILARITIES AND DIFFERENCES, SUPERORDINATE/SUBORDINATE, SPACE AND DIRECTION, CATEGORIZING VERSUS DESCRIBING, INTERSECTIONS, AND VALUES THAT SHIFT ACCORDING TO CONTEXT.

The object of this activity is to gather ideas about what we can see in the world around us and how we can talk about what we see. Although details are important, this activity is about more general ways of seeing.

Normally the activity would be suitable from the ages of nine to twelve or so, being careful to recognize developmental limitations with younger children (e.g., Olver and Hornsby, 1966). However, adults returning to the classroom can also benefit, using the activity in the sense of problem finding (Arlin, 1975) or adult cognitive development (Gardner, 1973).

The materials required are three pieces of coloured paper of identical size. The colours should be contrasting. There are two ways to go according to level of the students: light blue, dark green, and yellow will assure many representations of sky, grass, and sun, while orange, blue, and black will produce more variation. The product will be the size of one sheet.

The three colours should first be presented in different orders to observe their change in value. For example, orange and black will look more intense with light blue between them. Students should be given a chance to talk about what the colours mean to them in order to make them aware of the elements with which they will work - not just inwardly aware, but also able to express the awareness in language.

After discussion about the values and significance of the three colours, the instructions are as follows:

1. You will make a collage by cutting and pasting, using these three sheets of coloured paper.

2. Your final picture may be of any subject you choose. It is your creation. Do not copy your friend's picture!

3. Your collage is to end up the size of one sheet, so choose which sheet to use as background.

4. You must use all three colours.

5. Do a good job as we will all be looking at the collages.

6. If you want, you may put your initials in the bottom right-hand corner. In any case, put a mark there so we hold your picture the right way up.

Once all the collages have been completed and collected, they should be displayed in random order. The first question to ask is

"What do all these collages have in common?"

The correct answer to be accumulated is that the collages were all made by members of one class, using the same colours, and being of one size.

A title to this effect should be posted above all the collages. For example,

9" x 12" collages made by Class 6b from orange,
blue, and black paper

The next question may necessitate a hint or two to start the discussion:

"Do you see any collages that have something special in common which is not shared by all the collages?"

The students should be encouraged to come up with ideas such as: predominant colour; figurative or abstract design; use of lines, rectangles, circles, and triangles; symmetrical or asymmetrical designs; those basically on the horizontal, vertical, or diagonal; and portrayal of happy, sad, or threatening mood.

If the first suggestion for grouping is predominant colour and the student has only pointed to her own and her friend's collages, then the question should be

"Can we group all the collages according to predominant colour? If so, how many groups will we have?"

The answer to the last question might be that there are four groups if some collages have no predominant colour. The groups are separated, carefully labeled, and the collection completed with a title.

(See figure 1.)

The collages should be regrouped at least three times by different attributes in order to demonstrate the fact that categorizing is not describing the collages except for the one attribute which is the temporary relationship between them. During each grouping, the students should be made aware of the superordinate function of the title and the group labels, and the subordinate function of the collages within this hierarchy.

At the final grouping, with collages carefully titled and labeled, the concept of categorizing by more than one attribute, or intersections, can be introduced by combining the last grouping with an earlier one. (See figure 2.) It is important when forming the matrix to leave the original title in place. If nobody challenges it, then the fact that it is no longer appropriate must be brought to the students' attention. In the first group of activities collages were arranged by one attribute or another. Now the word and is to be substituted. The category is now defined by two attributes and the matrix is formed by three or more levels of each attribute.

The collages should be saved and returned to over a period of time with new insights, more careful use of vocabulary, and quicker responses expected.

The creation and categorizing of the collages presents opportunities not only to become aware of actions taken and their consequences, but also to learn how language is used in discussing these consequences. The students' products have been used as the materials of instruction, indicating that they are taken seriously and have worth, and assuring a measure of attention.

Reading and writing follow-up activities are countless. Space does not permit detailing them.

CONCLUSION

Gibson and Levin (1975, p.79) speak of systems of relations as structure. Transfer "implies travel within this highly complex and abstract system, not transport of a specific element...". In other words, transfer depends on being able to think in relational terms. The problem for teachers is that relationships cannot be memorized because they perform differently, or with variations, depending on the items being related. It is a treacherous area, full of shifting, changing combinations.

A reader has additional burdens in the form of prior knowledge, or lack of it. There must be particular prior knowledge, for example, that on indicates relationship in space, and relationship within a category, and or a choice within or between categories. This knowledge is part of our shared conventions of language; one of the symbol systems which transforms personal images into public forms (Eisner, 1980).

This paper has attempted to show that the arts can contribute to the understanding of relationships basic to reading by providing opportunities for students to deal actively with abstractions, and form perceptual images related to these abstractions. The arts can also provide a means for transfer of basic concepts by taking seemingly unrelated forms and providing occasions for discovering relationships. The arts provide this mediation not only through cognitive processes but also by offering personal challenges through novel and interesting activities.

Figure 1.

COLLAGES CATEGORIZED BY PREDOMINANT COLOUR,

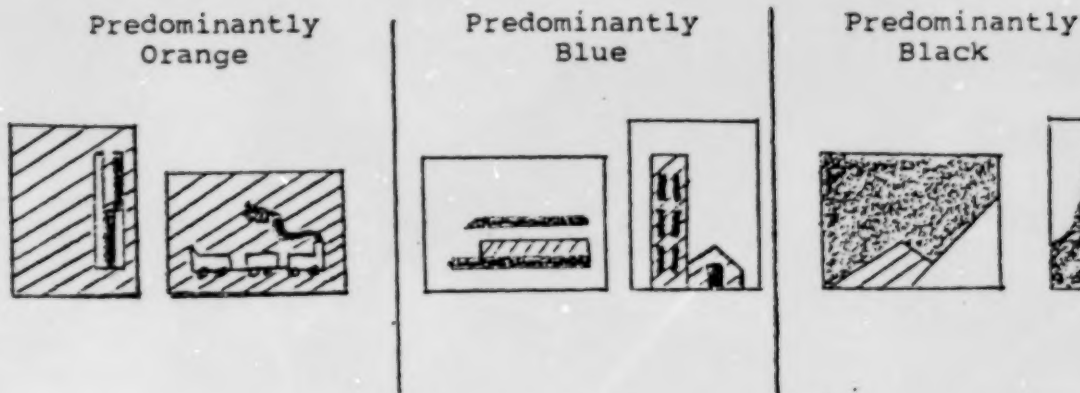
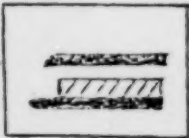
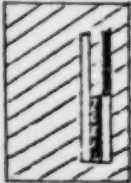
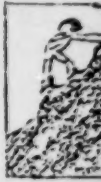


Figure 2.

COLLAGES CATEGORIZED BY PREDOMINANT COLOUR
AND BY LINE DIRECTION

Predominantly Orange	Predominantly Blue	Predominantly Black
Predominantly Horizontal 		
Predominantly Vertical 		
Predominantly Diagonal 		 

Code: Orange 
 Blue 
 Black 

(Original version included in presentation
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